SOIL conservation

U. S. Department of Agriculture/Soil Conservation Service/November 1973

Produce and protect

The expected large increase in agricultural production in the United States presents major responsibilities and fresh opportunities for the Soil Conservation Service and conservation districts.

The responsibility is to encourage land users to get additional cropland under a conservation plan promptly and to select for intensive farming those acreages that can be protected adequately from soil erosion. Closely related is the job of helping landowners find ways to increase farm and ranch income and production.

Secretary of Agriculture Earl Butz said recently, "While there is plenty of additional land in the United States that can be used for crop production without endangering our basic soil and water resources, there are also millions of acres of farm and ranch land with soils so prone to blowing or susceptible to water erosion that they should never be used for crops."

Also recently, the National Association of Conservation Districts called for a nationwide campaign to make sure farmers and ranchers use conservation practices to prevent accelerated wind and water erosion—to avoid another Dust Bowl.

We must work with farmers and ranchers to remind them that soil erosion control, or the lack of it, directly influences crop yields and farm income. One recent study, reported by the Agricultural Engineering Department of the University of Missouri, showed that soil erosion in some areas seriously reduced the production of corn and soybeans and resulted in a net income drop of $18.32 an acre on moderately eroded fields and $33.20 an acre on severely eroded fields. Production costs for these farmers rose 20 percent on moderately eroded fields and 56 percent on severely eroded fields, due primarily to the increased time and cost required to prepare the seedbed.

Conservation can increase net income . . . increase yields and crop quality . . . reduce production costs. This is nothing new to long-time farmers, but it may be to some of the other people we serve. The time for examples and testimonials is now. The time for letting people know what assistance we can offer them is now.

The strong demand for food products offers the American farmer and rancher an excellent opportunity to bring about real efficiency in his operations and to install good conservation systems.

For example, a bottomland farmer may now find it profitable to install tile drainage or to make other improvements in his water management system. He will gain in crop yields, be able to work his fields better, and reduce wet spots.

An upland farmer may be able to put in a new terrace system and thus add new acres of tillable land. An irrigation farmer may be able to afford ditch lining and save on his water use. Another farmer or rancher may have added incentive to bring his pasture and rangeland into first-class condition.

At a time when American farmers are producing more than ever, they should be enabled to install the necessary protective measures. The Soil Conservation Service must continue to help farmers and ranchers with efforts to retain the quality and productive capacity of their land for both the next year *and* the next generation.

Kenneth E. Grant

SOIL conservation

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COVER: Harvesting wheat in the rolling hills along the Columbia River in Oregon. These wheat areas are among the most productive in the world, but soil and water problems challenge farmers to protect while producing.

Prepared in the Division of Information, Soil Conservation Service, U.S. Department of Agriculture, Washington, D.C. 20250.

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Cattle and catfish on surface-mined land

by Kent Alverson
Public information officer, SCS
Lincoln, Nebraska

In Victoria, Illinois, cattle and catfish have helped prove that surface-mined land can be made productive again.

John W. Curry has 400 acres of such land on his 2,090-acre farm. Curry has one of the most unusually diversified farming operations in Illinois. He farrows and finishes 5,000 pigs a year, rides herd on 200 crossbred beef cows, and produces 200,000 commercial catfish annually. He employs four men full time.

It's the surface-mined land that gives Curry his biggest challenge and also the most adventure. As Curry sees it, there is no point in wishing the surface mining hadn't happened. The scars on the land can't economically be erased. But if a landowner is willing to adjust his thinking to accept the land's limitations, he can find a lot of opportunities.

In Knox County, surface-mined land has many water pockets that have a tight seal and remain full even though there is very little runoff from surrounding land. Somehow the pockets, or ponds, maintain their water quality. In 1968, Curry started his catfish enterprise by stocking 40 acres of these small ponds, most of which are less than an acre in size. Today he distributes more than 200,000 fingerlings to other pond owners and annually produces 50,000 pounds of dressed fish. He gets 10 cents each for his 4-inch fingerlings and just over $1 a pound at current wholesale prices for the dressed product.

Curry gives credit to Dr. Milton Bowman, professor of botany at Monmouth College, and to Ralph Wells & Co., makers of pet and fish food, for his being one of the pioneers in successful production of catfish in surface-mine ponds and for getting him started in the fish business.

"I followed Dr. Bowman around for 4 years while he was doing basic research on catfish, surface-mine water quality, food

It's hard to miss this sign when you drive past John Curry's fish hatchery.

Once of little value, lakes like this on surface-mined land are now used for catfish production.

requirements, and reproduction problems. We made lots of mistakes and had few successes," he recalled. "Later we teamed up with Ralph Wells & Co. to form a corporation called GWEBCO (from Gibbs, Wells, Bowman, and Curry). The partnership has since been dissolved, and I own the business and the name now."

According to Curry, "We brought in river catfish as a starter but couldn't get the female catfish to drop their eggs in captivity. Through the use of hormones we managed to overcome that problem. Then, when we got into production, we had to start a selling campaign to dispose of the catfish.

"Doctor Bowman is a gourmet cook. He talked to restaurant owners and showed them how to cook catfish. In this way we built up a market."

Curry, however, finds it easier and more profitable to sell fingerlings. "There are hundreds of sportsmen's clubs, large and small, with ponds and lakes to be stocked," he explained. "Besides, many pond owners turn to catfish when the standard bass-bluegill stocking formula fails to provide good fishing.

"Our best business is selling 8- to 10-inch fingerlings," said Curry. "Catfish must be that large to escape being eaten by bass that may still be in private ponds. Also, club owners with lakes and ponds want instant fishing for their members. I could sell tons and tons of the larger fingerlings to these clubs if I had them."

Another reason for shifting away from food production was the staffing problem. Few people have the talent, experience, and education for such a broad operation. In that business, a person needs economic sense and an ability to meet the public. Curry found he had to tend to too many details himself. His future plans therefore call for development of more recreation areas for fee fishing.

"With proper management and controls, we can put fish out and use fishing as a method of harvesting rather than the pump-down and seining approach used now," Curry explained. "Almost anybody I could hire can go out and feed the fish regularly in 40 ponds. By rotating the lakes we use and building up the reputation of individual lakes, we can keep up the excitement for the fishermen. One bit of strategy is to throw a little fish food into the water. The ensuing commotion shows the fish are there, and that's all it takes."

Water quality is maintained through fertilization, weed control, population control, and the rate of feeding.

The following are steps in fish production: (1) spawning, which occurs in the surface-mine ponds; (2) collecting the small fish (blue, channel, and albino catfish) and developing them into 2-inch fingerlings in tanks in a metal building; (3) feeding the fingerlings to the desired marketable size (4 to 12 inches); (4) harvesting, grading, and sizing; and (5) selling and distributing and public relations.

Does fish farming fit in well with other farming operations? Not too well, asserted Curry. It competes for time with most of the other work. Wet weather that stymies cropping chores also makes it hard to work with the fish. So it is really an additional farm business to be judged on a cost-return basis. It takes roughly 1½ pounds of feed to produce a pound of fish. Labor and equipment costs, too, can be accurately measured.

Curry's pasturelands for his Charolais-Hereford-Angus crossbred cow herd are surface-mine spoil banks that have been partially leveled and reseeded. The soils there are calcareous rather

John Curry "splash feeds" his catfish.

than acid, like those in many mined areas, so it is easy to grow alfalfa along with grass. Calves do well and leave their mothers with a 205-day adjusted weaning weight of 500 pounds. Most are sold to neighboring feeders.

Keeping track of cattle in the irregular, scattered surface-mine pasture areas is sometimes difficult, as is managing feed and water. But Curry is not one to take the easy way. And his attention to detail pays him good money.

He likes to purchase land in a low state of productivity and find ways of improving it. Starting with a soil survey map and other data provided by the Soil Conservation Service staff at Galesburg, he develops a suitable program. Curry is a cooperator with the Knox County Soil Conservation District and is recognized as a conservation farmer. He calls Len Gulson, SCS district conservationist, "a good friend and helpful adviser."

Curry sees other possibilities for use of surface-mined lands, particularly with the current demand for more kinds of outdoor recreation. Camping and bicycling have been cited as examples of good use. Curry plans to introduce swans, wild geese, and ducks to mine-spoil areas, hopefully for commercial gain.

From 1964 to 1968, Curry was a member of the U.S. Department of Agriculture's advisory committee on feed grain, wheat, and soybeans. He is vice president of the National Corn Growers Association and a former director of the Illinois Grain Corporation. He is also treasurer of Spoon River Farm Supply, Inc., and has repeatedly held offices in the Knox County Farm Bureau. He was recently honored by *Prairie Farmer* magazine with the Master Farmer award. ♦

Conservation tillage jumps in Iowa

by Wilson T. Moon
State conservationist, SCS
Des Moines, Iowa

Increased crop production and land protection went hand in hand with energy conservation on 5½ million acres of Iowa's corn and soybean land this year. It was all possible because, in place of the moldboard plow, conservation tillage, also known as minimum tillage, was used to prepare seedbeds.

The 5½ million acres planted by conservation tillage methods in 1973 is nearly a 90 percent increase over last year's 2.8 million acres. With an estimated 18.8 million acres of corn and soybeans in the state, it also means that more than one-fourth of Iowa's cropland was planted using some type of conservation tillage.

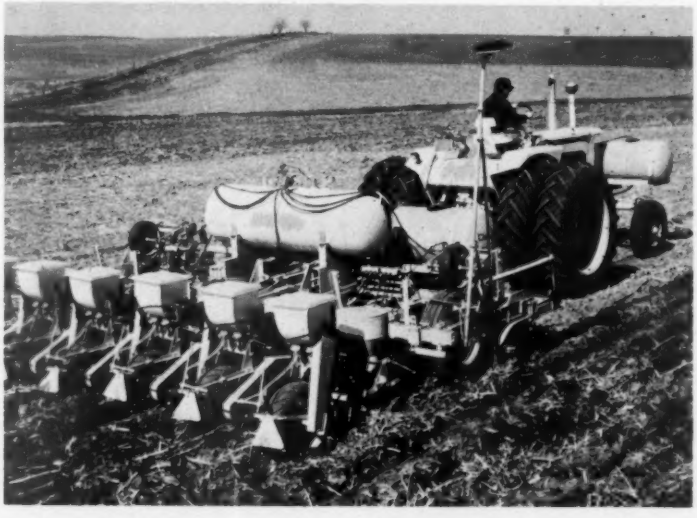
According to a survey by the Soil Conservation Service, about three-fourths of Iowa's conservation-tilled land was planted after discing or after use of a field cultivator or similar machine. This leaves some residue on the soil surface, providing for better erosion control.

The most popular of the special conservation tillage methods, according to the survey, was the chisel plow. It was used on more than a million acres. Others, in order of popularity, were till planting, 265,184 acres; rotary strip tillage, 147,510 acres; and no-till planting, 110,414 acres.

Only 5 years ago, there was virtually no conservation tillage in Iowa. Acceptance of the practice comes at a critical time, for it gives Iowa farmers and the rest of the nation's food producers an opportunity to produce on their land and protect it at the same time.

Iowa farmers say that conservation tillage helps them in at least three ways: (1) leaving crop residues on the soil surface helps stop wind and water erosion, (2) fewer trips made across a field mean saving fuel and energy, and (3) the fewer trips across a field give the farmer more time for other work.

With current concerns about fuel and food shortages, "produce and protect" is a great idea. ♦



A chisel planter planting in old corn residue—more than one-fourth of Iowa's cropland was planted using some type of conservation tillage in 1973.

A row planter on a Corning, Iowa, farm—the field was not plowed prior to planting.

Soil interpretations for environmental forestry

by Vincent J. Price
Information Division, SCS
Washington, D.C.

Dear Sir:

I recently bought a parcel of land that includes an old farm pond. I'd like to plant some trees around the pond for shade and beauty. Where can I get information on the kind of trees that will grow best on my land?

The Soil Conservation Service receives many such letters concerning environmental forestry—the management of trees and woodland for esthetic, wildlife, and recreational values.

Public interest in environmental forestry is growing rapidly. Farmers want trees for windbreaks and wildlife habitat. Cities and towns plant trees along streets, in parks, and in open areas. Homeowners like ornamental trees around their houses. Developers of industrial sites and subdivisions recognize the importance of trees in landscaping, and more and more people are buying small parcels of forest land for personal pleasure.

The capabilities and limitations of their soil will make a difference to all of these people. Will the soils at a subdivision site limit the developer in his use of trees for landscaping? What should a farmer plant for his windbreak? Can a certain type of tree grow well along a steep streambank?

Soil Conservation Service specialists point out that soil interpretations for environmental forestry often provide the answer.

A tree's environment

Trees, like people, are adaptable. Many of them, given half a chance, will grow under a variety of conditions. But most trees are

Imagine what this housing development in Lake County, Illinois, would look like without ornamental trees and shrubs.

Shelterbelt plantings in the Palouse of Washington provide habitat for pheasant.

best suited to a specific type of soil, weather, and topography.

Soil drainage is perhaps the most important single factor in determining which trees to plant in an area. Some trees, such as bald cypress, grow best in very wet spots. Other trees, such as white oak, are almost always found on well-drained soils.

Soil texture affects the general water-holding capacity of a soil and helps determine how well trees will grow. In northern Michigan, the red pine does best on sand soils, the white pine on loamy sand soils, and on sandy loam or other finer textured soils deciduous trees, rather than pines, will be the species found.

Depth to bedrock limits the type of tree that can be planted successfully. Trees with deep rooting systems will do poorly in soils that are shallow to bedrock. When trees are unable to root down properly, there is the increased danger of their being "thrown" by a heavy wind.

Soil chemistry, as gardeners know, also affects tree growth. Northern white cedars prefer alkaline soils, while dogwoods grow best in acid soils.

The relationship between trees and soil is a flexible one. For example, landowners in northern Michigan can plant red pine in fine-textured soils, and the trees may grow well if the landowners protect them from competition. Similarly, if a landowner plants dogwood on highly alkaline soil, or redbud on highly acid soil, generous applications of sulfur or lime can make the soils more suitable for those types of trees.

But in most cases, land users would do well to plan trees and woodland with a close eye on the soil. By picking the tree species that are naturally adapted to his soils, the land user puts himself in the happy condition of working with nature. He'll likely get faster tree growth, a better survival rate, and healthier trees.

Trees and soil surveys

For decades, soil scientists have been mapping soils in all parts of the country and have interpreted the soil data for farmers, engineers, home builders, planners, and local government

Washington hawthorne trees, in the background, and azaleas add to the beauty of Dulles International Airport, near Washington, D.C.

officials. In the past few years, interpretations for environmental forestry have been included in some soil surveys. To make these interpretations, SCS soil scientist-forester teams study the occurrence and growth rate of tree species on specific kinds of soil. They measure the height and diameter of the trees and determine their age. They classify the soil and describe its important properties. This procedure matches kinds of soil with suitable tree species. Nearly 1,000 areas are studied each year.

"These soil-woodland site studies provide a tremendous amount of basic data," said Dr. Donald E. McCormack, assistant to the director of SCS's Soil Survey Interpretation Division. "We've learned a good deal about the unique relationships between soil properties and tree growth, and we've quantified these relationships."

The original impetus of the program was better management of commercial tree species such as maple, Douglas fir, or pine. But site study teams also note the understory vegetation, and this information is readily transferable to environmental forestry uses.

Trees for people

Lake County, Illinois, a metropolitan county north of Chicago, was once a forest of oak, maple, hickory, and tamarack. Few areas of woodland remain today, and commercial forestry is of little importance to this area. But environmental forestry—trees for people—is important, and this is reflected in the recently completed "Soil Survey of Lake County."

The survey places Lake County soils in six tree-planting groups, and suggests forest, ornamental, and windbreak plantings for each group. For example, recommended forest plantings for somewhat poorly drained silt loam soils that have slow permeability are sycamore, green ash, red maple, and silver maple. Recommended medium ornamentals (30 to 60 feet high at maturity) for the same soils are willow, birch, moraine locust, northern white cedar, and aspen. Recommended small ornamentals are American arborvitae, European alder, eastern redcedar, and crabapple.

The county's soils are also placed into shrub- and vine-planting groups. Species are recommended for each group, and characteristics of each species are given, such as height, form, and tolerance to sun and shade. Other data—that the plant bears fruit, provides wildlife food, must be grown from cuttings, is slow growing, best uses for shrubs—can be very helpful to homeowners.

"This information is used quite frequently by individual homeowners," reported Lee Bridgman, the SCS area conservationist at Edwardsville. "We've got a lot of suburban estates, 2 to 10 acres in size, in the county. And many of the landowners make use of the soil survey in planting trees and shrubs.

"The soil interpretations are also used by village officials and in park and school districts. The Lake County Forest Reserve uses them in determining where and what to plant on its large holdings. The nearby Cook County Forest Reserve also uses Lake County interpretations because the Cook County soil survey has not been completed."

According to Earl Voss, SCS state soil scientist for Illinois, "Similar interpretations are available or are planned for most of the Chicago metropolitan area, including Kendall, DeKalb, Cook, DuPage, and Kane Counties and the predominantly rural Kankakee and Grundy Counties."

Soil interpretations for environmental forestry are not included in all published soil surveys. There are plans, however, to make these interpretations available to anyone who needs the information and can secure a soils map. Then homeowners, builders, park commissioners, and county planners around the nation can have ready access to more of the information they need to successfully plant and grow trees for people. ♦

Conservation in action at Boy Scout Jamboree

by Duane A. Bosworth
Information specialist, SCS
Portland, Oregon
and Byron A. Breisch, Jr.
District conservationist, SCS
Butler, Pennsylvania

At about 8 o'clock each morning, a goshawk suddenly dropped from the sky, flew slowly over a little marsh and the adjoining field, wheeled in a tight circle to avoid the tall lodgepole pines along the edges of the small open area, and took a close look around for squirrels, chipmunks, and edible birds.

His daily rounds had to be made early because within the hour the site would be swarming with hundreds of Boy Scouts, Scout leaders, and visitors.

Here at the little marsh, which was built by the Soil Conservation Service, in the environmental conservation education area at Boy Scout Jamboree West, Scouts learned the meaning of interdependence among different forms of life in an ecosystem. The water environment of the marsh provided a habitat that attracted a variety of insects, birds, and small mammals. As the predator at the top of the food pyramid, the goshawk must have been amazed at the deluxe accommodations provided for him.

Across the continent at Boy Scout Jamboree East, other Scouts participated in similar conservation learning experiences that SCS had a major role in arranging. Against a backdrop of second-growth hickory and oak, the Scouts began their activities by studying a colorful mural that depicted changes in the landscape over the last 15,000 years and changes in use of the land on which Jamboree East was being held.

The scene portrayed by the mural started with the retreat of the most recent glacier, which changed the direction of flow of streams, altered the landscape, and helped to form the soil on which the forest now grows. Then the scene shifted to use of the land by Indians and moved on to show early white settlers at work clearing the original forests for farmland.

Coal mining, oil production, and recreation use of the land today completed the sequence of land use changes depicted on the mural.

The 1973 Scout Jamboree was held simultaneously at two locations during the last week of July and the first week of August. The site for Jamboree East was Moraine State Park, about 40 miles north of Pittsburgh, Pennsylvania. The park, 15,000 acres of land that until recently had been extensively surface mined, gave Scouts many opportunities to see the results of reclamation and conservation work. Lake Arthur, a newly created, many-fingered 3,200-acre body of water within the park made it possible for Scouts to enjoy water related activities.

Jamboree West was held at Farragut State Park, a 5,000-acre reserve on the shores of beautiful

Waldo Potter, district conservationist at Provo, Utah, briefs Scouts at the entrance to the SCS "Conservation in Action" trail at Jamboree West.

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1. The inviting coolness of an SCS "rap area" stimulated discussions of conservation measures with Marlow Freckleton (center), district conservationist at Coeur d'Alene, Idaho.
2. Good water management in arid western states begins with data on the snowpack in the mountains, and Scouts at Jamboree West were intrigued by snow survey equipment as its use was explained by Jim Englebright, range conservationist at Weiser, Idaho.
3. Scouts learn from Scouts during a demonstration showing how grass and mulch protect soil and help prevent erosion that, in turn, causes sediment pollution of water resources.
4. Ted Pettit (left), manager of conservation services for Boy Scouts of America, stopped at one of the SCS instruction stations at Jamboree West to commend Ralph Fisher, district conservationist at Craigmont, Idaho, on the success of the SCS conservation education areas.
5. Tom Balthasar, district conservationist at New Bloomfield, Pennsylvania, explains splash erosion caused by the force of falling raindrops.
6. Miniature soil profiles assembled in plastic tubes by Scouts as part of their conservation instruction were popular Jamboree souvenirs.
7. A colorful mural by artist Doug Pifer for Jamboree East depicted 15,000 years of changes in land and resources in the Moraine State Park area.

Kenneth Williams (left), director of the SCS Regional Technical Service Center, Portland, Oregon, listens to Jimmie Gleaton, district conservationist at Prosser, Washington, describe the use of different grasses for wildlife food and cover at the edge of the small marsh at Jamboree West.

SCS created model backyards at both Jamboree sites to demonstrate to Scouts the use of trees, shrubs, and flowers in providing food, nesting areas, and shelter for many different kinds of birds. Bill Forrest, district conservationist at McMinnville, Oregon, explains to two Scouts how they can attract birds to their homes.

Lake Pend Orielle in northern Idaho. This park served as the site for the 1969 National Scout Jamboree and for the World Jamboree held in 1967. The National Jamborees are held every 4 years.

More than 75,000 Scouts participated in the 1973 Jamboree, and about as many adults visited the sites to observe Scout activities. The environmental conservation areas, among the most popular program attractions, were developed and manned by about 20 private, state, and federal resource agencies and organizations working with Ted Pettit, manager of conservation services for the Boy Scouts of America.

SCS developed a "Conservation in Action" learning trail for the Scout environmental conservation areas at each of the Jamborees. The trails featured a series of conservation instruction stations, and emphasis was on helping Scouts understand significant soil-water-plant relationships and principles of good land use and conservation. Ideas that Scouts could adapt in carrying out environmental improvement projects in their home communities were built into each demonstration at the instruction stations.

Very popular in the SCS areas at each Jamboree were the soil study stations where Scouts made their own artificial soil profiles from sterilized soil and rock. There the boys also participated in a demonstration of the value of plant cover and mulch in controlling erosion by water. They discovered how water quality is reduced when water moving over the surface erodes bare soil and carries sediment into streams and lakes.

A working model of a sediment control basin at Jamboree East gave Scouts an interesting lesson in the use of conservation measures to improve water quality, and a model of a typical Pennsylvania watershed helped them understand how an urbanizing watershed can be developed without damage to the natural resource base.

A major part of the water resource management and conservation story at Jamboree West was presented in a color mural depicting the snow-survey and water-supply forecasting activities of SCS.

Giving full-time assistance to SCS instructors at Jamboree West was David Alford, from the Idaho State Soil Conservation Commission. The Commission, along with Kaiser Aluminum Co., First Security Bank of Idaho, Boise-Cascade Corp., and J. R. Simplot Co., provided Scouts with copies of conservation materials produced by the Soil Conservation Society of America.

Contributions to the SCS educational program at Jamboree East were made by Butler County Conservation District, Butler County Parks and Recreation Commission, Bureau of Parks and Bureau of Forestry in the Pennsylvania Department of Environmental Resources, Pennsylvania State University, Slippery Rock State College, and local business firms. ♦

Water on every pasture

by Jerry D. Schwien
Public information specialist, SCS
Denver, Colorado

"Stock ponds are as obsolete as a buggy whip," claims John Toedtli, a rancher in Sterling, Colorado. "Cattle drink much more water when it is clean and cool and not all muddy."

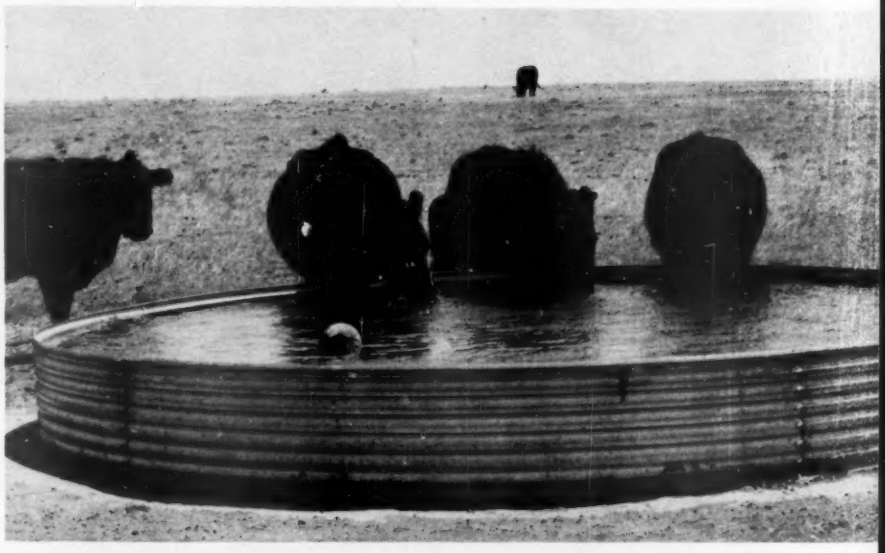
Toedtli and his father Bill credit their new system of water tanks and managed grazing with increasing their cattle gains.

"Our yearlings come off the grass at least 40 pounds heavier since we've developed water within easy walking distance and managed our grazing," said John Toedtli.

None of the Toedtlis' 250 Angus-Hereford beef cows and their calves travel more than half a mile for water. The father and son ranchers have split the 14,000-acre ranch into 25 pastures with water tanks located approximately a mile apart.

When they first purchased the ranch one pasture took in 4,500 acres and had only one watering pond. Joe Krebs, of the Soil Conservation Service, said the only time cattle grazed the far end was in the fall when it was cool enough to travel for water. The pasture was overgrazed near the water and undergrazed elsewhere.

With cost sharing under their Great Plains Conservation Program contract, the Toedtlis installed 10 miles of fence dividing the 4,500 acres into 6 pastures. They laid 50,000 feet of pipeline to pump water to each pasture and installed stock tanks for the cattle to drink from. The tanks and fences were needed to carry out the kind of grazing manage-



Dividing a 14,000-acre ranch into 25 pastures and installing water tanks about a mile apart have helped increase cattle gains for John Toedtli, a Colorado rancher.

John Toedtli installed a "drinking fountain" at this tank. A pipe bubbles the fresh spring-fed water above the water level in the tank.

John Toedtli, on the left, and his father, William Toedtli, on the right, get together frequently with Joe Krebs, SCS district conservationist, to discuss future conservation plans for the ranch.

Because of managed grazing, yearlings on the Toedtli ranch come off the grass at least 40 pounds heavier. The cattle have water within easy walking distance.

Toedtli plans to slope these gullies and seed them to stop erosion.

ment that would give the range a chance to improve.

Toedtli said it was cheaper to lay miles of pipeline to the various pastures and provide the necessary windmills than to drill wells. "Wells in this part of the country are 500 to 1,000 feet deep," he said.

Most of the Toedtlis' water is now pressure pumped to each pasture. They still use a few windmills and springs. One spring delivers 10 gallons a minute. John winters cattle in this area. The water never freezes. "When it got 28° below zero last winter, steam was really pouring out," said Bill Toedtli.

John Toedtli is a firm believer in pitting his hardland pastures, which he does with an eccentric disc-type pitter.

"It really pays off in summer when we get 1 or 2 inches of rain in 10 or 15 minutes. Normally the rain would all run off. But the pits hold it on the land and let the water soak in. We pitted our first pasture in 1969. Now, that pasture has more grass in the fall after grazing than it used to have in the spring," said John.

He has an irrigation reservoir which when full will hold 625 acre-feet of water. He uses it to irrigate 90 acres of alfalfa. The last 7 years, however, have been dry. Last year the reservoir only irrigated 40 acres of alfalfa. It is fed by a spring and runoff from 11 square miles of drainage.

The water delivery system from the reservoir to his irrigated hayland was improved by installing an 18-inch concrete pipe. Before, it took an hour for water to travel the old ditch from the reservoir. Now it takes only 6 minutes.

The Toedtlis have just about spent their $25,000 ceiling of cost share funds allowed in the Great Plains Conservation Program. They've spent about $27,000 of their own money on conservation practices.

Altogether under the Great Plains program they've installed 54,682 feet of stockwater pipeline, 49,949 feet of cross-fencing, 3,075 feet of concrete ditch lining, 20 stockwater tanks, 2 spring developments, 1,100 cubic yards of diversions, 2,500 cubic yards of dikes, and 1 well. Almost 6,000 acres have been pitted and 95 acres seeded.

"We still have some critical area seeding for which we'd like to get cost sharing, but we'll probably do it on our own," said John.

"We need to bank slope some gullies and fertilize and seed them to stop erosion," he said.

In addition to ranching, John Toedtli is active in the community. He is a supervisor of the Peetz Soil Conservation District. And Bill Toedtli, not to be outdone by son John, was honored this year as conservation rancher of the year in the Goodyear Conservation Awards. ♦

conservation in action

Get a grip on your grass

When you like raising high-quality registered Herefords, you have to give special attention to your rangeland.

Leonard Lodoen farms north of Westhope, North Dakota, on beachline sands that are very fertile but highly erosive. Lodoen is a young farmer, and his main interest is the registered Hereford business. He joined the Great Plains Conservation Program in 1970 because he wanted to increase his cow herd and establish high weaning and yearling weights.

His first need was for spring grass pastures; one of crested wheatgrass to begin the season, and one of bromegrass. One pound of alfalfa per acre was planted with the crested wheatgrass and brome because of its nitrogen and protein contribution.

The second need was to establish high-producing native pasture for summer use—mid-July to September. The area previously used for summer pasture was almost 100 percent in Kentucky bluegrass of low vigor. Kentucky bluegrass has the same season of use as tame grasses (crested wheatgrass and brome) without the productivity. Lodoen plowed the area in 1972 and this year seeded native grasses—western wheatgrass and green needlegrass.

Dugouts and cross fences were built for stockwater and grazing distribution. A new well will provide fresh water late in summer.

These changes have helped stabilize the soils, increased beef production with low per unit costs, and allowed Lodoen to concentrate on raising quality registered Herefords.

With good grass stands, rotation and deferred grazing, reliable water, and fertilization, Lodoen believes he can double production without abusing the land.—PAUL F. L. HAROLDSON, *soil conservationist, SCS, Westhope, North Dakota.* ♦

GPCP works for young and old

Marcus Witte and David Kruse are ranchers in northern New Mexico. They have much in common. Both believe in range management, including brush and erosion control, seeding, and other soil and water conservation practices. Their cattle are fat and healthy and bring top market prices. Both participate in the Great Plains Conservation Program, which is administered by the Soil Conservation Service.

There is one difference, however. Witte is 73 years old, and Kruse is 23.

The Witte operation is in colorful country—atop a broad mesa near Pecos, New Mexico. Kruse's ranch is on lower ground—on the rolling hills near Wagon Mound, the town named after the mountain resembling an old covered wagon.

Both men have had to overcome rangeland problems, but

Marcus Witte, a 73-year-old rancher in Pecos, New Mexico, feeds some of his cattle while talking to Dave Carter, SCS district conservationist at Pecos. As a participant in the Great Plains Conservation Program, Witte often gets advice from the Soil Conservation Service.

David Kruse, on the left, a 23-year-old rancher, and Harold Dineen, SCS district conservationist at Mora, New Mexico, check the results of deferred grazing practices on Kruse's ranch.

their range management practices and a lot of old-fashioned work are paying off, and they can see the results.

Witte started his ranch from a 1921 homestead. Through the years he has acquired adjacent lands and now owns nearly 6,000 acres. Most of this is rangeland. He leases an additional 480 acres and has a permit to graze 133 cattle from September 1 to November 30 on the Barbero allotment of the Santa Fe National Forest.

Pinyon-juniper invasion is a serious problem on the rangelands in this area. Witte by himself has cleared 1,112 acres and plans to clear 250 acres more.

Witte has installed 28,688 feet of distribution pipelines from his headquarters well. A large storage tank and numerous drinking troughs provide water for livestock and game on most of his ranch.

To spread runoff water and correct headcutting in gullies, Witte constructed two diversion dikes—one is 216 feet long and the other is 400 feet long. His ranch roads are partially graded and are well drained to prevent soil loss.

Witte has made good use of cost-sharing funds provided by GPCP, and he isn't finished yet. He has 580 acres that need conservation treatment.

Young Kruse is a native rancher; he grew up on the land. He has started a conservation grazing system on his 4,100-acre ranch aimed at systematic and efficient production of first-class cattle. This year he marketed 90 head at a "good" price.

His latest conservation work under the Great Plains program has been installing ponds and water retarding dams.

Kruse, a graduate of Highlands University, Las Vegas, New Mexico, likes ranching. "With a lot of hard work and the right conservation practices, it pays off," he said.—LOUIS H. LASH, *public information specialist, SCS, Albuquerque, New Mexico.* ♦

From gully to grass

The roar of water rushing through a gully after every heavy rain is not a pleasant sound—especially when the gully is on your land and the sound reaches you from a quarter of a mile away.

Carl Lindlauf farms near Voltaire, North Dakota, and he had such a gully a couple of years ago. A long mile of grass has replaced that gully, and rainwater passes silently over the area. And it's certainly easier to farm the adjoining fields now.

The new grassed waterway and a lot of other conservation practices became possible when Lind-

lauf tied his operations to two important agreements. One was with the South McHenry Soil Conservation District and the other with the Soil Conservation Service. Through SCS, Lindlauf became a participant in the Great Plains Conservation Program. His contract, signed April 28, 1971, covers 1,475 acres of land; 1,059 acres of that is gently rolling cropland.

Lindlauf's goal was to increase his livestock operation, but he wanted to correct his erosion problems as well. His big gully was so deep that farm machinery could not go across it. By converting his less productive land to grass, he was able to achieve both goals. In the process, he discovered that the Great Plains program is tailor made for his purposes.

In June 1971, the Soil Conservation Service planned and designed a grassed waterway 5,810 feet long and 94 feet wide. It was shaped and seeded shortly afterwards. It was damaged slightly by heavy rains in the spring of 1972 but has now been repaired and reseeded.

To slow runoff into the waterway and protect adjacent land from wind and water erosion, Lindlauf farms the field in 20-rod strips. He also has planted 20,000 lineal feet of single-row tree belts at 40-rod intervals.

In addition to his waterway, tree plantings, and stripcropping, Lindlauf seeded 87 acres of cropland to permanent grass in 1971, 70 acres in 1972, and 156 acres in 1973. He also built a 1,800-cubic-yard stock dam for better grazing management.

Lindlauf's conservation practices that are not cost shared include proper hayland management on 202 acres, pasture management on 138 acres, proper range use on 60 acres, and crop residue management on 1,000 acres.—DENNIS D. ROSCOE, *district conservationist, SCS, Towner, North Dakota.* ♦

Planned grazing systems work in "bluestem country"

The planned grazing system concept is perhaps the most significant idea to come riding across the Kansas rangelands in many years. Lewis Freeman and his wife Estelle of Elk County think so, because planned grazing systems have worked well for them.

Before 1966, most of Freeman's 130 cattle grazed yearlong on native-grass pastures. Some grazed on rented pasture in summer. The Freemans were putting out more than 100 tons of hay each winter and feeding 4 or 5 pounds of 20-percent protein supplement daily to each cow.

In 1966, after getting planning assistance from the Soil Conservation Service, they planted a field of sudangrass-sorghum and then rotated the cows between rangeland pastures and the sudangrass-sorghum pasture when it was ready. They noticed the bluestem grass made good recovery while the cows were off of it in late summer; it furnished a lot more

Lewis and Estelle Freeman of Elk County, Kansas, are firm believers in a planned grazing system.

grass in winter, which reduced hay consumption.

In 1967, the Freemans started rotating grazing periods between rangeland pastures to give the native grasses in each pasture a rest during the growing season. This practice has been widened to include every piece of rangeland on the ranch.

"The improved vigor of the better grasses—big bluestem, little bluestem, indiangrass, and switchgrass—has increased forage production by at least one-third," remarked Freeman. "Hay needs have been reduced from 100 tons to about 21 tons and protein supplement to one-half."

In 1970, after one of the hottest and driest summers on record, the Freemans had plenty of grass left for wintering their increased herd of 200 cows. "The extra vigor built up in the deep-rooted grasses paid extra dividends when the drought hit," said Estelle Freeman.

How do the Freemans decide when to rest a pasture? They watch the "key plants" such as little bluestem. When the bluestem is about half used, they move the cattle to another pasture. In dry years, this move will be sooner; in wet years, it will be later. Each pasture is usually rested at least 2 months—about one-half of the growing season.

The Freemans still rent other rangeland from neighboring landowners. The neighbors like what they see in the way of grazing management on the Freeman pastures and are changing the rigid lease arrangements on their land to allow flexibility. This will allow a planned grazing system to benefit their land as well.—GLENN P. SNELL, *district conservationist, SCS, Howard, Kansas.* ♦

GPCP shows him the "big picture"

Bill Carpenter, of Scott County, Kansas, says the Great Plains Conservation Program helped him to see how his whole conservation farming program fitted together. He and his son-in-law, Larry O'Bleness, farm 2,400 acres on the Kansas High Plains.

An old "drylander," Carpenter decided to irrigate part of his farm in 1966. He drilled two irrigation wells and began his long struggle to use each gallon of water to its fullest extent.

His search for the best methods of irrigating ended with a Great Plains Conservation Program contract. He ended up with a conservation plan for the nonirrigated cropland as well as a long-range irrigation development plan designed to fit his particular needs.

"The long-range planning made me think in terms of 10 years and longer," remarked Carpenter. "My objective now is to hold all the water I can get and wear it out by using and reusing it as long as I can."

Carpenter terraced the nonirrigated cropland fields with federal cost sharing under his GPCP contract. The terrace channels were built extra wide and flat for good distribution and infiltration of water. Companion practices are stubble mulching and contour farming.

"These practices do more good than the terraces, but terraces control the runoff from heavy rains and prevent erosion," Carpenter said.

The system for irrigating 800 acres of cropland was also designed for total use of all available water. Water is pumped through underground pipelines to minimize water losses. The entire acreage was leveled for efficient control and distribution of water. And finally, 3 miles of waterways collect the irrigation tailwater and storm runoff in 2 pits for reuse in the irrigation system.

Carpenter indeed wears out all the water he pumps and all the water that falls on his farm.—JAMES HABIGER, *RC&D Project Coordinator, SCS, Minneapolis, Kansas.* ♦

Review

Salinity—A Water Quality Problem. By Carl Anderson, Sheldon Boone, Glen Loomis, and Walter Ochs. *1973. USDA-Soil Conservation Service, Task Force Report. 122 pp., illus.* Discusses the West's problem of high salt concentrations in water, which affect crop yield and production costs and limit water use for municipal and industrial and fish and wildlife purposes. Reports on SCS and USDA concern and involvement in the problem in the Colorado River Basin and Colorado's Grand Valley area. Presents USDA's statements from the Federal-State "Conference in the Matter of Pollution of the Interstate Waters of the Colorado River and Its Tributaries." Cites recommendations for potential future SCS activities and programs.

How to Control a Gully. Written by C. J. Francis, 1961; revised by R. C. Barnes, Jr., 1973. *Farmers' Bull. 2171. 16 pp., illus.* $0.25. Describes conservation practices for preventing or controlling gullies. These practices not only help to reduce soil erosion and sedimentation but also help the farmer to increase the economic value of his land.

List of Published Soil Surveys. *1973. USDA-Soil Conservation Service. 16 pp.* Lists the soil surveys published by the U.S. Department of Agriculture since 1899 and tells how copies can be obtained.

Conservation Tillage. Proceedings of national conference sponsored by Soil Conservation Society of America (7515 Northeast Ankeny Road, Ankeny, Iowa 50021) in cooperation with American Society of Agronomy, American Society of Agricultural Engineers, and National Association of Conservation Districts. *1973. 242 pp., illus.* $5. The 33 reports by individuals in the fields of research, education, and industry cover the concept of modern tillage, management principles, environmental considerations, and economics. Soil properties, weeds, disease and insect control, importance of nutrient availability, wind and water erosion control, irrigation, stubble mulching, double cropping, and equipment are some of the topics discussed. A summary of the general acceptance of minimum tillage is included.

Meetings

November

11–16 American Society of Agronomy, Crop Science Society, Soil Science Society of America—Joint Annual Meeting, Las Vegas, Nev.

12–14 Geological Society of America, Dallas, Texas

12–16 National Water Resources Association, Phoenix, Ariz.

12–16 American Association of State Highway Officials, Los Angeles, Calif.

12–20 National Grange, 107th Annual Session, Lincoln, Nebr.

25–27 American Society of Farm Managers and Rural Appraisers, Denver, Colo.

December

2–5 National Conference on Access to Recreational Waters, Fort Lauderdale, Fla.

2–6 National League of Cities, San Juan, Puerto Rico

2–8 National Association of Manufacturers, New York, N.Y.

5–6 Twentieth Annual Meeting of Keep America Beautiful, Inc., New York, N.Y.

5–7 Western Forestry and Conservation Association, San Jose, Calif.

11–14 American Society of Agricultural Engineers, Chicago, Ill.

January

14–17 North American Game Breeders and Shooting Preserve Association, Inc., Sacramento, Calif.

16–17 National Council of Farmer Cooperatives, Washington, D.C.

17–19 American Farm Bureau Federation, Atlantic City, N.J.

18–23 American National Cattlemen's Association, San Diego, Calif.

20–24 National Association of Home Builders, Houston, Texas

23–26 National Woolgrowers Association, San Diego, Calif.

31–Feb. 2 Sixth Annual Catfish Farmers of America Convention and Trade Show, Memphis, Tenn.

Recon . . .

Your own information center. About a year and a half ago, SOIL CONSERVATION carried an article about the Westmoreland County Conservation District's Environmental Information Center. Since then, the Pennsylvania district has had requests for its *Directory of Environmental Information* and for details on establishing an information center from practically all of the 52 states, Canada, and even Thailand. The mechanics for establishing an environmental information center and a program for providing environmental information to the public are available from the Westmoreland County Conservation District, 415 S. Main Street, Greensburg, Pa. 15601. Include a self-addressed stamped envelope with your request.

Soils and sewage systems. A pilot RC&D program to provide technical assistance to homeowners and homebuilders in planning and constructing sewage disposal systems is underway in the East Central Vermont RC&D Project area. The program, administered by two natural resources conservation districts, contains provisions for research on the ability of various soils to absorb sewage effluent. The Environmental Protection Agency is processing a grant application for the program.

Ecological parking lot. One of the nation's first "ecological parking lots" was installed recently at a new town being built north of Houston. The half-acre lot is paved with a recently developed porous asphalt that allows rainwater to seep through and eventually return to the natural water table. A battery of instruments, some imbedded in the pavement, will monitor the performance and effectiveness of the material. An adjacent lot will be conventionally paved for comparison purposes.

A 12-inch bed of rock underlays the test lot, creating a reservoir capable of storing 5 inches of rain until it percolates into the soil.

Also being studied is the new town's drainage basin as the area changes from undeveloped land to urban land. An innovative drainage system has been designed to conserve water and retain the forested character of the 18,000-acre town site.

Sewage sludge study slotted. Scientists at the Agricultural Experiment Station of the University of Minnesota, St. Paul, are studying methods for applying sewage material—sludge—on agricultural land, while controlling pollution of surface and ground waters through a program of total water management. The Metropolitan Sewer Board of St. Paul and the Soil Conservation Service are cooperating in the 1-year study. Primary site for the study is the 60-acre research watershed of the Rosemount Agricultural Experiment Station, Rosemount, Minnesota.

Adopt a stream. Volunteers are caring for eight streams flowing into Lake Champlain from New York and Vermont under an "Adopt a Stream" program sponsored by the Lake Champlain Committee, a citizen group with 1,800 members. The program was established to give citizens an opportunity to help restore and improve the streams in the Champlain Basin. The Committee has workshops to provide guidance in setting up programs that include water quality sampling, pollution monitoring, cleanup of riverbanks, acquisition of flood plain or natural areas for preservation and public use, and establishment of educational activities for schools.

Free firewood. Prompted by predictions of a long, cold winter and expected shortages in heating fuels, the U.S. Department of Agriculture is allowing more people to cut firewood in national forests—at no charge.

Christmas trees go on giving. Last year, after Christmas, Rhode Island's South County Garden Club collected 800 discarded Christmas trees and placed them along a 200-foot-wide beachway to help reduce dune erosion. And in Albany, New York, used Christmas trees were fed through a shredder and reduced to mulch for soil protection and enrichment.

Many groups are reported planning "treecycling" projects for this year. *The Avant Gardener*, a horticultural news service, says that whole trees make fine snow fences and sun and wind screens for exposed broadleafs; whole or cut-up trees are excellent fillers to control erosion in gullies; and a single tree can serve as a birdfeeder in a backyard if suet, bacon fat, and containers of seed, peanut butter, or other foods are attached to it.

More conservation assistance. The Public Advisory Committee on Soil and Water Conservation at its recent meeting made several recommendations to the U.S.

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Department of Agriculture concerning conservation and other land uses. Committee recommendations included the following:

—That the Secretary of Agriculture vigorously pursue action to lift manpower ceilings for soil and water conservation personnel;

—That USDA provide more resource information to state and local officials and other decision makers in land use planning;

—That the Soil Conservation Service accelerate the completion of modern soil surveys because of their important relationship to land use planning;

—That USDA resubmit its proposal to implement the land inventory and monitoring authority as provided in the Rural Development Act of 1972.

EPS (Environmental Protection Saint). The National Wildlife Federation reports that the Vatican recently announced that St. Anthony the Abbot may now be "officially invoked" as the patron saint of the environment. St. Anthony's papal appointment was apparently awarded because of the 11th century conservation practices of the monks of the order later named after him.

Anthony, an Egyptian who lived in the 4th century A.D., spent the bulk of his 105 years living in caves and existing on bread, salt, and water. The Hospital Brothers of St. Anthony, however, were once widely famed for their tree planting zeal and their tenacity in land reclamation.

Strippers in sheep's clothing. Overgrazing by cattle is serious, but overgrazing by sheep can be worse—they can strip the ground of cover very quickly. And there are reasons to anticipate problems. Lew Yarlett, SCS regional range conservationist for the West, notes that scarcity of petroleum products has hurt the manufacturers of synthetics, and as a result demand for wool has shot up. Sheepmen and district supervisors will have to take care that the increased demand isn't met by denuding the land of cover.

Go West! In a paper entitled "A Future of Population Growth in Accord With National Needs," presented at a seminar on "Development and Population: Alternative Futures in the West," at Colorado State University, Victor Koelzer, former chief engineer for the National Water Commission, urged that the federal government subsidize the development of small growth centers in the West to accommodate future population increases and help relieve environmental problems in the overcrowded metropolitan centers of the East.

Koelzer believes that existing water supplies in such areas as the Upper Colorado River Basin should be reserved for industrial and municipal uses instead of for future irrigation projects.

Rather than spending an estimated $500 million for authorized irrigation projects which have not as yet been started, Koelzer argues that these funds should be used instead to encourage industrial growth in the area.